

REMARKS

In the Office Action mailed July 11, 2008, the Examiner rejected claims 1-6 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent No. 5,561,742 to Terada et al ("Terada") in view of U.S. Patent No. 4,683,772 to Colimitra et al ("Colimitra") and U.S. Patent No. 6,459,956 to Matsumoto et al ("Matsumoto"). Applicants respectfully traverse the rejections and request reconsideration in view of the following remarks.

Terada describes a method for controlling multiple-robot system and preventing interference between those robots. According to Terada, a maximum value and a minimum value of a spatial or operating region of a robot is determined from the robot's current position. If it is found that the operating region of one robot does not interfere with the operating region of another robot, the two robots are operated at the same time. If it is found that the operating regions of the two robots interfere with each other, the operation of the first robot is stopped while the operation of the second robot continues with a changed operating region so that the second robot will not interfere with the first robot.

The Examiner seems to equate the "sphere Cha" in Terada to the "three-dimensional spatial regions" as recited in the claims, and the "spatial region" between Pa1 and Pa2 or between Pb1 and Pb2 in Terada to the "virtual safety barrier" as recited in the claims. Applicants respectfully disagree. As shown in FIG. 1 and as described in the specification, Terada assumes a "sphere Cha covering the wrist Wa and the hand Ha" and sets the X-Z plane Pa1 to "a position such that the plane Pa1 contacts the sphere Cha." *Terada*, col. 4, ll. 8-16 (emphasis added). As illustrated in Terada, the plane Pa1 is defined by the sphere Cha and is in contact with the sphere Cha, and

therefore, the plane Pa1 cannot work as a safety barrier for the sphere Cha. In addition, since the plane Pa1 would always be in contact with the sphere Cha, Terada does not disclose or suggest “braking of the arm at a predetermined distance ahead of the virtual safety barrier” as recited in the claims.

The planes Pb1 and Pb2 cannot be the virtual safety barrier either. The claims recite “a virtual safety barrier including a movement trajectory of a work or tool mounted on a wrist of an arm of the robot in operation, the virtual safety barrier being set inside the physical safety barrier and surrounding the movable robot.” The spatial region defined by planes Pb1 and Pb2, which is for Robot Sb, does not surround Robot Sa. Nor does the spatial region defined by planes Pb1 and Pb2 include a trajectory of a work or tool mounted on a wrist of an arm of the Robot Sa.

Accordingly, neither the spatial region defined by planes Pa1 and Pa2 nor the spatial region defined by the planes Pb1 and Pb2 can be equated to the “virtual safety barrier surrounding the moveable robot” as claimed. Therefore, Terada does not disclose or suggest the virtual safety barrier as recited in the claims.

Moreover, Terada discloses determining whether the spatial regions of the two robots cross, but fails to disclose or suggest “determining a predicted position of each of the defined three-dimensional spatial regions based on the trajectory calculation, and matching the predicted position of each of the defined three-dimensional spatial regions with said virtual safety barrier” as recited in the claims. The Office cites Abstract, col. 7, l. 66-col. 8, l. 35, and Figure 1 as allegedly teaching such elements, but the cited passage at least fails to teach the above-cited claim elements.

In addition, Terada does not disclose or suggest "carrying out a control to start the braking of the arm at a predetermined distance ahead of the virtual safety barrier and stop the movement of the arm ahead of the virtual safety barrier if it is determined that any one of the three-dimensional spatial regions in at least one predicted position thereof based on the trajectory calculations will come into contact with said virtual safety barrier" as recited in the claims.

Colimitra discloses a remotely operated hand gear train having three degrees of freedom about the axes A1, A2 and A3. Colimitra does not disclose or suggest the claim elements as discussed above.

Matsumoto, which was cited as allegedly teaching the "physical safety barrier", fails to cure the basic deficiency of Terada in view of Colimitra as discussed above.

In view of the foregoing amendments and remarks, Applicants respectfully request the timely allowance of the pending claims.

If the Examiner believes a telephone conversation might advance prosecution, the Examiner is invited to call Applicant's undersigned attorney.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: October 10, 2008

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